

# **Mental health in deaf and hearing impaired children and adolescents.**



**En litteraturstudie**

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# **Mental health in deaf and hearing impaired children and adolescents**

## **ABSTRACT**

About 1 in 1000 children and adolescents are deaf or hard of hearing. It has been hypothesized that they have a higher burden of mental health problems.

The studies done so far indicate that the prevalence of mental health problems is 2-3 times higher than among their hearing peers, ranging from 20 to 50%. However, the data basis on which these estimations rely is far from clear.

Four factors seem to impact significantly on mental health in this group: communicative problems, additional disability, low IQ and abuse/physical discipline. Several other factors such as having only one parent and no siblings and low educational level of the parents are assumed to represent risks. Some studies show that gender and choice of school may also be important factors. Adolescents have more (and different) problems than children.

The most commonly occurring mental health problems are affective problems, peer problems/social problems, behavioral problems and autism. Future studies of prevalence should collect data not only from parents and teachers, but also from the hearing impaired children and adolescents themselves, a multi-informant approach. The mental health services for hearing impaired and deaf have multiple challenges, and need to be further developed to reach acceptable quality and accessibility.

## INTRODUCTION

One in a 1000 kids and adolescents in European countries are deaf or have a moderate/severe hearing impairment. Norges Døveforbund (The National Association of Deaf People in Norway) assumes that there are approximately 5000 deaf individuals in Norway, and as many as 20.000 people using signing language on a daily basis. In the age group below 18, there are about 2.700 persons with severe hearing impairment and about 630 deaf children. WHO estimates that 32 million children in the world have disabling hearing loss.

Whether these young people suffer from more mental problems and psychiatric illnesses has been examined in a few studies over the last decades.

The aim of this article is to review the present knowledge on the prevalence and causes of mental health problems among young people with hearing impairments.

Methodological shortcomings of the reviewed studies are discussed, and proposals for future studies will be presented.

Disabling hearing loss is defined by WHO as a hearing loss greater than 40dB in the better ear in adults, and a hearing loss greater than 30dB in the better ear in children. The degree of hearing loss may be moderate (41-60 dB loss in the better ear) or severe (61-80 dB hearing loss). This article will explore the different types and causes of hearing impairments in children and adolescents.

Congenital hearing loss is any hearing loss that is identified at or shortly after birth, it may be hereditary or nonhereditary. The hearing of all newborn is screened and continually monitored in children with known congenital infections. Other hearing impairments develop throughout childhood.

## CAUSES OF HEARING IMPAIRMENT

The causes and consequences of hearing loss among children and adolescents are diverse. The most important causes of hearing loss are presented below (;16).

### **Conductive hearing loss**

Conductive hearing loss involves any cause that in some way prevents sound from reaching the inner ear. It is normally based on a mechanical problem in the outer or middle ear: the pinna, external canal, tympanic membrane, or ossicles.

### *Congenital anomalies*

Microtia, atresia or significant stenosis occur in approximately 1 per 10,000 births and are often associated with other craniofacial abnormalities. The most common abnormalities of the ossicular chain are absence or misalignment of the crura of the stapes, but conductive hearing loss is most often caused by abnormality of the incus or malleoincudal joint. Osteogenesis imperfecta is an autosomal dominant condition that can cause fracture of the ossicles.

### *Infections*

Infections cause accumulation of debris, edema, or inflammation leading to blockage. Otitis media (OM) is the most common childhood disorder associated with conductive hearing loss. By the age of three, 83 percent of children have experienced at least one episode. The infection results in a conductive hearing loss by preventing the tympanic membrane from vibrating adequately due to fluid filling the middle ear space. The decreased movement of the ossicular chain leads to a median hearing loss of 25 dB.

Conductive hearing loss caused by *tympanic membrane perforation* is common. Perforations result from many different events, including blast injury, barotrauma, foreign body trauma, temporal bone fractures, ear infections, self-inflicted trauma or the hole may persist after tympanostomy tubes fall out.

### *Trauma*

Blunt trauma can lead to temporal bone fracture. The traditional classification system divided temporal bone fractures into longitudinal (80% of fractures, typically conductive hearing loss) or transverse (more often associated with sensorineural hearing loss). However, the current classification of temporal bone fractures focuses on whether the otic capsule is spared.

### *Tumor*

Malignant tumors such as squamous cell carcinoma and proliferative disorders, including Langerhans cell histiocytosis can cause conductive hearing loss. However, these diseases are relatively rare compared to the nonmalignant cholesteatoma, which occurs congenitally or after formation of a retraction pocket in the tympanic membrane. Otosclerosis (overgrowth of sclerotic, hypervascular bone) is uncommon in children.

## **Sensorineural hearing loss (SNHL)**

Sensorineural hearing loss is caused by diseases of the inner ear, cochlea, the auditory nerve, the internal auditory canal, or the brain.

### *Intrauterine infections:*

Cytomegalovirus is the most common cause. Ten percent of the affected are symptomatic, and approximately 60 percent of these develop hearing loss.

Toxoplasmosis occurs in 1 in 1000-8000 births. 90% are asymptomatic at birth. The exact incidence of hearing loss is unclear.

Rubella: between 5 and 25 percent of women of child-bearing age remain susceptible to rubella infection. The incidence has declined dramatically since the introduction of the rubella vaccine. Hearing loss affects 68 to 93 percent of children with congenital rubella, it is usually profound and bilateral, and sometimes progressive.

Syphilis has been steadily increasing since 1985. 1/3 - 2/3 of infected infants are asymptomatic at birth, but sensorineural hearing loss occurs in 30 to 40 percent of these infants, as a late manifestation after 2 years of age.

*Low birth weight babies:* Among babies with low birth weight (<1500 g) the prevalence of hearing loss is high, 51 per 10,000. This prevalence is linked to several factors, including ototoxic drugs such as aminoglycoside antibiotics, noise produced by the incubator and perinatal complications. Hyperbilirubinemia results in neuropathy to the cochlear nuclei and the central auditory pathways.

*Bacterial meningitis:* is the most common cause of postnatally acquired deafness in childhood. Sensorineural hearing loss develops within the first 48 hours in the course of bacterial meningitis, and persistent hearing impairment varies from 2.5 to 18 percent in survivors. Another 10 percent suffer transient hearing impairment.

*Ototoxic drugs:* Aminoglycosides, intravenous loop diuretics, and chemotherapeutic agents such as cisplatin may cause hearing loss. Macrolides, vancomycin, and tetracycline have ototoxic effect in patients with impaired renal function. Reversible hearing loss may be caused by Aspirin, other NSAID drugs and antimalarial medications.

*Loud noises:* Constant exposure to loud noises, for instance produced by personal listening devices, can cause high-frequency SNHL. The highest prevalence is seen in youth aged 12 to 19 years, estimated up to 19, 5%.

*Trauma:* to the temporal bone usually causes sensorineural or mixed hearing loss. Perilymph fistula (PLF) is an uncommon leak of inner ear fluid through a defect in the otic capsule, it can be caused by trauma or by a congenital defect of the stapes footplate.

*Tumor:* The most common tumor that causes SNHL is a benign vestibular schwannoma/ acoustic neuroma, which is rare in children without neurofibromatosis type 2.

*Metals:* Heavy metals like Cadmium, mercury, and arsenic may have toxic effects on cochlear cells. In addition, lead can have neurotoxic effects.

#### *Hereditary etiologies:*

Hereditary bilateral sensorineural hearing loss occurs in about 1 in 2000 births and accounts for nearly 50 percent of the cases of SNHL. One third of these children also have other anomalies.

80 percent shows an autosomal recessive pattern. Common associated syndromes are Usher syndrome, Pendred syndrome, Alport syndrome, and Jervell-Lange-Nielsen syndrome (long QT syndrome with deafness)

15 percent are autosomal dominant. Common associated syndromes are Waardenburg syndrome types I and II, neurofibromatosis I and II, and branchio-oto-renal syndrome.

2 percent are X-linked, and the most common syndromes are Hunter syndrome (mucopolysaccharidosis 2), Alport syndrome, X-linked congenital SNHL, and early onset progressive sensorineural hearing loss.

One percent is based on mitochondrial dysfunction. These types may occur isolated or with other features of mitochondrial disorders.

Conductive and sensorineural hearing loss may also appear in combination.

The studies that empirically examine whether deafness and hearing impairment increase the risk of mental illness are relatively few. The prevalence of each of the above causes is normally very low. Therefore, mental problems in hearing impaired people cannot often be linked to specific causes. This fact represents a problem, since some of the factors behind hearing impairment have a variety of adverse consequences, whereas others cause hearing impairment only.

## **MATERIAL AND METHOD:**

The literature search applied the following terms: (deaf OR hard of hearing OR hearing impairment) AND (prevalence of mental health OR psychology OR psychiatric disorder) AND (children OR adolescents). The search resulted in 360 articles in PubMed, of which only 15 seemed relevant. A couple of relevant articles were not produced by the search, but were recommended by the National center for deaf and hearing impaired children and adolescents at Gaustad, and some background information come from these articles. A few other relevant articles have been discovered through references in the review articles, and some of these have been included in table 1 and in the discussion of results.

## **RESULTS**

The prevalence varies among the different studies, and many different factors which potentially influence mental health has been identified. Table 1 summarizes the main results:

Table 1: Main findings in the fifteen studies examining mental problems in young people with hearing impairments.

	Prevalence		Method and Material	Limitations
Prevalence and correlates of psychopathology in a sample of deaf adolescents. (;13)				
	Psychiatric caseness	49 %	70 deaf adolescents aged 13 to 21 years . The data come from a checklist assessment by parents: CBCL: the child behaviour checklist, from the teachers: TRF: the teachers report form and from the the adolescents themselves in semi-structured clinical interview for children and adolescents: SCICA. Experts rated the dossier data and explored the cross- informant agreement.	26% refusal (older, low IQ, in conflicts)
	Emotional	27 %		
	Behavioral	11 %		high rate of oral communication
	Other	7 %		teachers- not correct estimates

The mental health of deaf adolescents with cochlear implant compared to their hearing peers. Austria. (:8)				
	Peer problems	teachers rated significantly more cases	32 adolescents with cochlear implants. Compared to 212 normal hearing peers. All mean age 15 years. Assessed by using the SDQ: strength and difficulties questionnaire, filled in by the teachers and parents.	Asked only teachers and parents
	Emotional problems	No significant difference		
	Social problems/ PBS pro-social behavior	No significant difference		
	Behavioral problems	No significant difference		
	ADHD	No significant difference		
	Conduct-problems	No significant difference		
comparison of the prevalence of mental health problems in deaf and hearing children and adolescents in Australia.(:10)				
	Social problems (parents significantly more concerns)		66 deaf children and adolescents studied. Age 6-18 years old. Their teachers and parents filled in the child behaviour checklist. 38 of the youth participated themselves assessed with the YSR: youth self report.	Response rate: 28 %
	Thouht problems (parents significantly more concerns)			
	Preferred mode of communication has important implications on accurate reporting of the prevalence.			
Mental health problems of Dutch youth with hearingloss as shown on YSR= youth self report. (:12)				
	Mental health problems	2-3X higher	Sample of 202 youth, aged 11 to 18 years old. Assessed with an adjusted version of the YSR: youth self report.	
	Low IQ: more internalizing and social problems			
	Specialschools: higher rate			
	Deaf participants scored significantly higher than hard of hearing			
mental health problems of Dutch youth with hearingloss as indicated by parents responses to the child behavior checklist (:11)				
	Overall problems	41% = 2,6 X raised. (Normative sample 16%)	238 deaf children studied.Age from 4 to 18 years old. Assessed with the CBCL: child behaviour checklist, filled in by the parents.	Asked only parents.
	Emotional			
	Behavioural problems			
	Adolescents more problems:			
	anxiety, depression and social problems			
	Low IQ: social problems, thought problems and attention problems			



Self-rated mental health, school adjustment, and substance use in hard of hearing adolescents: mild or moderate hearingloss: (:2)				
	mental symptoms	considerably higher scores	From the big survey "life and health-young people" that included all 15/16 years old adolescents. There were 56 (1,9%) "hard-of-hearing (HH) students with multiple disabilities. 93 (3.1%) students who were "just" HH. 282 (9.7%) students with some "other disability than HH," and 2,488 (85.2%) students with "no disability". This study only included the students with a mild or moderate hearing loss, and compared them to	
	Substance use	Higher scores if HH and other disability.		
		No significant differences in just HH.		
	School problems	considerably higher scores		
Psychosocial development in a Danish population of children with cochlear implants and deaf and hard of hearing children: (:4)				
	Psychosocial difficulties	3,7 X higher	334 children with hearing loss studied. Assessed by teachers with the SDQ: strengths and difficulties questionnaire, and 4 different scales measuring sign language, spoken language, hearing and psycosocial difficulties.	completed by teachers
	Additional disabilities	3X more risk		only children in special schools
	Boys: 2X higher risk than girls. Less problems in the children with good language abilities: signed or oral.			
Mental Health and self-image among deaf and hard of hearing children. (:9)				
	Same as the hearing		111 hard of hearing children aged 11-18 years old. 28 attended special school for the deaf, 23 in special school for the hard of hearing, and 60 were mainstreamed in regular schools. Assessed with 'I think I am' to assess self-esteem, and the SDQ to screen for mental health problems.	mental retardation were excluded
	More problems in the special schools for the deaf.			43 % response rate
Mental health problems in deaf children. (:18)				
	Mental health problems	40 %	Review article.	
	Clinically significant	20 %		
	Risk increased	1,5-2 X		
	Behavioural problem/ADHD			
	Autism spectrum			
	Emotional problems			
	Deafness with CNSdisorder: 6X risk.			
	Additional disability: 30% increased risk.			

Mental health of deaf people (:6)				
	Emotional problems	2X higher	Systematic Review	
	Behavioural problems	2X higher		
	Psychosocial difficulties	3X higher		
	Autism	2-4% =higher		
	Additional disabilities: 30% increased risk			
	Degree of hearing loss: no correlation			
	Not understood within family: 4 X more problems			
Reading the signs, impact on signed vs written questionnaires on the prevalence of psychopathology among deaf adolescents. (:3)				
	Interactive: problems in total:	42,6%, OR:3,2 95% CI = 1.83-5.58	54 adolescents with severe hearing loss in public and private schools. 29 male and 25 female. Assesed with a new CD- interactive version of YSR and the written YSR. Parallel forms were completed by parents (CBCL) and teachers (TRF).	
	Somatic complaints	OR 4,8		
	Social problems	OR 8,3		
	Thought problems	OR 5,7		
	Withdrawn/depressed	OR 6,5		
	Written: problems: total: no difference to normal hearing (18,9%):	21,40 %		
	No difference: Rule breaking behaviour	OR: 1,5		
	No difference: Attention problems	OR: 1,1		
Characteristics of children and adolescents in the Dutch national in- and outpatient mental health service for deaf and hard of hearing youth over a period of 15 years (:14)				
	Pervasive dev. disorders	23.7% (vs 12,3%)	389 deaf and hard of hearing children were studied. 3361 hearing children were included for comparing the prevalences. All were first referrals to a center for child and adolescent psychiatry.	High amount of deaf: 68,9%
	Mental retardation	20.3% (vs 3.9%)		22.3% was severely hard of hearing
	Emotional disorders	32.6%, not ment.ret		few (13.7%) had a non-syndromal hereditary hearing impairment
	Behavioral disorders	38.2%, not ment.ret		
	One parent family	38,6% (vs 25,8%)		21.3% had a disabling physical health condition
	Low education of parents	44,2% (vs 31,1%)		
[Hearing impairment and psychopathological disorders in children and adolescents. Review of the recent literature]. (:1)				
	Prevalence rates vary:	15-60%	Review article.	
	Same prevalence of ADHD			
	Affective disorders: same in Hearing/HOH/deaf			
	Psychotic disorders: same prevalence			
	More autism			

Psychiatric disorder in deaf and hearing impaired children and young people: a prevalence study. (;7)				
	Psychiatric disorder total	50,30 %	Psychiatric screening questionnaires for deaf children and adolescents were first piloted in a group of 62 children 11-16 years old in a residential school. Parents checklist and teachers checklist were used in 93 children attending 1 deaf school and 3 hearing impaired units. A diagnostic interewiew CAS: child assessment schedule were done with an interpreter to sign language.	Small study
	School for deaf	33 - 42,40 %		only positive screened interviewed in deaf.
		N: 15/46		others also interviewed in H.I.U group.
	Hearing impaired unit, mainly only spoken language.	57 - 60,90 %		87 % responserate
		N: 20/35		
Boys score higher				
Correlates of mental health disorders among children with hearing impairments. (;5)				
	<b>Any psychiatric disorder</b>		95 pupils with hearing impairments of > 40 dB and normal IQ. 47 females and 48 males. 6- 16 years old. Assessed with a structured clinical interview and SDQ. Detailed social information was gathered from the teachers and the parents.	
	Point prevalence:	32,60 %		
	Lifetime prevalence:	45,30 %		
	<b>Depression</b>			
	Point prevalence:	7,40 %		
	Lifetime prevalence:	26,30 %		
	Understood within family:	OR 4,12		
	Teased/maltreated/isolated	6 X more problems		

## DISCUSSION

The overall finding in these studies is that the total prevalence of mental health problems is 2-3 times higher among the children and adolescents with moderate or severe hearing impairment, compared to peers without such impairment. The figures range from 20% to 50%. (;13,8,10,12,11,2,4,18,6,3,14,1,7,5). However the findings are not unambiguous, since some studies do not demonstrate increased prevalences.

Many different factors have been assumed to impact on the development of mental health problems in these children. Some of them are shown to have a clear direct influence, while the importance of others remains unclear. Moreover, some of the factors are clearly not significant predictors.

### *Strong predictors*

The reviewed studies indicate that the child's ability to communicate satisfactory and effectively with parents and peers is the factor with the greatest bearings on the prevalence of mental health problems. Other strong correlates are multiple disabling physical health conditions, low IQ, abuse and being physically disciplined. Other factors seem to be less influential, but are still acknowledged as dimensions that should be further examined: families with only one parent and no siblings and low educational level of the parents. The increased and different burden of mental health problems in adolescents compared to children is another field that should be further explored. Each of these factors will be discussed more closely below.

*Communication:* Good communication with family and peers seems to be a major predictor of good mental health in the referred studies. (;8,11,4,6,5,18) Good communication within the family, with friends and others in the child's surroundings is accomplished when people in the surroundings are well trained in sign language. It seems crucial to be able to express thoughts and feelings, particularly in close relationships. Relational and behavioral problems are ameliorated through open communication, which promotes understanding of self and others and counteracts development of depressive thoughts and feelings. Not being understood within the family increases the risk of developing problems 4 times. (;6,11,5) In line with this a study found that children of parents that are hard of hearing or deaf themselves have less problems than children of parents with normal hearing. (;1,14). Being able to communicate with hearing peers will make it easier to build social networks and relations. The number of words known is markedly decreased in populations with hearing impairments. Language development is often delayed. It has been shown that the hearing impaired command only half the vocabulary of a hearing person of the same age. (;6)

*Additional disabilities:* Some of these children and adolescents are living with different types of additional disabilities, for instance decreased vision, learning difficulties, problems with neuropsychological functioning or motor skills and other difficulties and challenges. These problems may be integral parts of a syndrome, and interfere with development of language and intelligence. They may in turn impact on family composition, need for special schools, everyday functioning, need of help, assistance and support and a lot of other variables which independently influence mental health. A series of studies show that suffering from more than 3 physical disabilities increases the risk of mental health problems by 30% (;13,2,18,6,14). Furthermore, many of the studies have demonstrated a negative association between IQ and mental health. On this basis, some researchers have excluded mentally retarded persons from their samples (;13,12,11,6,14,18).

*Physical discipline and abuse:* A study has shown that hearing impaired children are more likely to be physically disciplined than their hearing peers. It has also been shown that the mental health of children who have been teased, maltreated or isolated are markedly decreased (;5). Furthermore, it has been found that these children are more likely to be victims of abuse, with a clearly additive negative influence on mental health (;6, 5,18).

*Family composition and parental education:* The increased load of environmental stress of these children and adolescents clearly makes them vulnerable to mental health problems. Having parents with a low educational level is believed to be a risk factor for more mental health problems. The prevalence of parents having a low educational level is found to be higher amongst deaf and hard of hearing children (44,2%) than among their hearing peers (31,1%) (;14). Family composition might also affect the development of problems. (;8,14) Having a one-parent family is believed to be associated with a higher burden of mental health problems, this is more prevalent in the families of the hard of hearing and deaf children (38,6%), compared to the hearing children (25,8%)(;14). The rates of divorce are known to be higher when caring for a child with a handicap, and the challenges for these children are complex and highly variable. Being in a family with no siblings has been shown to increase the risk of mental health problems.

*Adolescents:* The burden of disease seems to be higher amongst the adolescents compared to the youngest children.(;3,11) Puberty is a tough time for all youth, and the hearing impaired and deaf seem to be particularly vulnerable to the challenges of this transitional period.

*Not correlated:* The degree of hearing impairment or hearing loss is not correlated with the range of mental health problems.(;6)

*Unclear predictors:* The impact of gender and choice of school has yet to be determined.

*Gender:* One study found that boys in special schools had a double risk of problems (;4,7) Traditionally, boys tend to express troubles through behavior, a fact that makes them easier to detect by their teachers. Therefore, this finding needs further examination.

*School:* The person's choice between a mainstream school and a special school for the deaf or hard of hearing has been shown to impact on their mental health in some studies, but not in others. Some discussants hold that life in a segregated school is likely to become a burden, whereas others consider it an advantage because communication is easier in an environment fluent in sign language. The latter also assume that the risk of being different than the others and being bullied is less in special schools, which facilitate attachment and development of identity. However, a small study found a trend that total mental distress and peer problems were lower in mainstream schools for children with a high level of spoken language (;15). It has not yet been demonstrated that a high competence in sign language results in significantly lower prevalences of peer problems in special schools. The only prevalence study which found better figures in special schools has methodological shortcomings, i.e. the sample is small, based on a screening test using a questionnaire filled in by parents and teachers, the researcher chose who to interview, but interviewed only positively screened in schools of the deaf, and both negatively and positively screened children from the hearing impaired units. Thus, its findings may rely on methodological bias (;7). Close mentorship is likely to promote identification, assessment, and gratification of special needs, thereby adding to the feeling of competence and mental wellbeing in these children. The special schools often have fewer pupils and trained teachers who can address problems earlier than in a mainstream school. In some cases the schools could be placed at a fair distance away from the home of the children and their families, as there are only 5 sign-language-environment-high schools in Norway. No studies specifically investigate the effect of living away from home, but the findings that having no siblings and only one parent affect the mental health of the children negatively indicate that a strong social family relation is protective (;8,14) .

In sum, the rate of mental health problems seems to be higher in the special schools for deaf children, whilst the rates in special schools for the hard of hearing do not differ significantly from the rates among hearing impaired children included in ordinary schools (;8,12,9,6). This can be due to a variety of other characteristics of the pupils in need of a special school for the deaf. The core protective factor seems to be having positive peer relationships in school.

*Types of mental health problems:*

Hearing impaired children and adolescents basically suffer from the same psychiatric illnesses as other children, but it seems that some diagnoses/symptoms are more frequent than in the hearing population: affective symptoms, peer problems/social problems, behavioral problems and autism/pervasive developmental disorders. Significant differences have not been demonstrated with regard to substance use (;2), ADHD, psychotic episodes and rule breaking behavior (;8,3,1).

*Affective symptoms :* The prevalence of affective symptoms is 2 times higher than amongst the hearing peers (;13,10,12,11,6,3,14,5,18). Depressive symptoms in these children and adolescents possibly result from the experience of having a handicap, being bullied at school, lack of important communication abilities and of opportunities to express and discuss their concerns and feelings, being physically disciplined, having peer problems, lack of social affiliation and having a complex challenge in life, compared to their hearing peers.

*Peer problems and social problems:* Peer problems and social problems also seem to occur more often in this group. (;8,10,12,11,2,4,6,3). A systematic review concluded that the prevalence of psychosocial problems is 3 times higher in the population of deaf and hard of hearing. Behavioral problems also seem to be to be twice as big as in the deaf and hearing impaired population. (;13,11,4,6,3,14,18) The lack of communication skills and ability to understand other children's reactions and feelings are likely to cause peer problems and behavioral problems. A higher rate of behavioral problems reported by teachers might be due to the fact that they are the easiest to observe in class at school.

*Autism and pervasive developmental disorders :* Autism and pervasive developmental disorders are also raised amongst these children (;6,14,1,18), i.e. the prevalence is 2-4%, compared to 1,1% in the normal population. However, the traditional gender difference (the disorders are more prevalent in boys) has not been demonstrated among hearing impaired children. It has been written about lack of 'theory of mind' as a problem for communication and understanding. (;12) Theory of mind is the ability to recognize and understand mental states in themselves and others, such as beliefs, wishes, intentions, desires, and knowledge. The next step is to be able to realize that the beliefs, desires, thoughts and intentions of others may differ from your own. In many of the deaf and hard of hearing children and adolescent a lack in skills in 'theory of mind' has been demonstrated, causing them to have both behavioral and peer problems. (;18,19)

### *Limitations of the studies:*

Many of the studies of Table 1 have few participants, and high amounts of drop-outs. Most of them are based on written questionnaires. Only a few of the studies have collected data directly from the youth and children themselves. They mostly rely on assessments made by parents and teachers, a fact that may have led to underestimation of the prevalences of mental problems (;13,8,11,4). The lack of direct information may also cause help seeking delays with potentially adverse clinical effects. Deaf and hearing impaired children are older at their first referral (;14).

A small study found that the total prevalence of mental disorders was twice as high (prevalence 42,6%, compared to 21,4%) when information was collected in direct interaction with the hearing impaired person, using a CD-interactive version with sign language presentation of the questions instead of the written questionnaire. More somatic complaints, social problems, thought problems and depression/withdrawal were discovered (;3). Because these symptom categories are amongst the more prevalent in the group, data should also be collected from the children and adolescents themselves with a method of good communication in future studies. This requires that relevant assessment instruments must be translated to sign language. Such translation is considered an important task at The National Centre for Hearing Impairment and Mental Health.

### *The future:*

More exact knowledge of prevalences and symptom profiles will allow parents and teachers to direct both clinical and preventive interventions more precisely. In addition, such knowledge is likely to promote more open communication and removal of stigma connected with mental problems among the hearing impaired. In turn, this will increase the quality of estimates of prevalence in the future.

Teaching in sign language is an important aspect of prevention. According to the law of education all children who need to learn sign language have the right to get adequate education at school. At the age of 14 they may choose one of the five special high schools which use sign language or they may use an interpreter at their local high school. Many choose to stay in their local school, and get all their sign language training at a competence center, from 4 to 12 weeks a year. The training of parents' sign language skills is important to secure communication in the families, but remains a big challenge.



The national center and the organization for the deaf and people with a hearing impairment must be more active in preventive work amongst the deaf and hearing impaired children and adolescents. Supporting parents with a hearing impaired child in their communication with both each other and their child, supporting and guiding the schools with a hearing impaired child and making preventive strategies against abuse will be important parts of the preventive work. The ordinary services for psychological help and treatment in Norway are not well accommodated to people with hearing impairments. The therapists normally do not command sign language, and lack adequate knowledge of the culture and social situation of the deaf. A specific mental health care system for this particular group in Norway comprises a national competence center and four regional services. These institutions produce research and information and supervise health care workers in the ordinary system. The general aim is to provide high quality specialized services to this particular patient population and the parents. The available mental health services need to be more prominent and accessible. More specific work can be done to provide a better mental health service to the hearing impaired. The threshold for seeking help and advice is likely to be high among the deaf and hard of hearing. When children and adolescents are left to handle their problems themselves for a long time, the troubles are likely to become more complex and harder to treat.

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